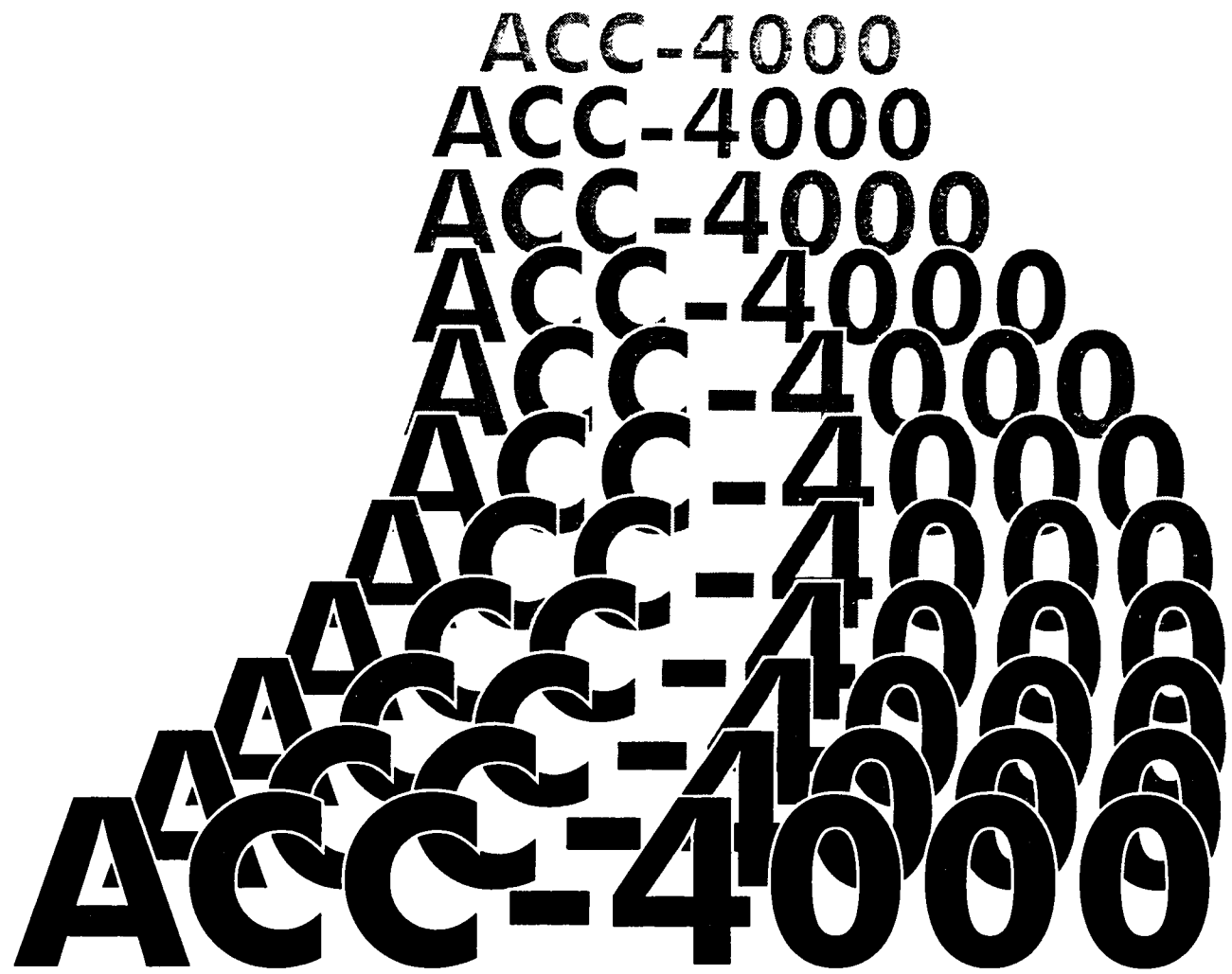


VOLUME I

Overview of the ACC-4000 System



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Errata to Volume I

The following are corrections and additions to this volume that reflect the changes to the ACC-4000 software in version 6.2.

Version 6.2 Software

Read references to Volumes II and III (*The Graphical Interface* and *The Character-Based Interface*) as references to Volume II (*The ACC-4000 System User Guide*).

Chapter 1

Read references to Volume IV (*Reference*) as references to Volume III (*System Administrator Reference Guide*).

P.4 Replace the hardware list at the top of the page with:

Chapter 2

- 1 CPU (computer) 50 MHz with:
 - Three hard disk drives
 - 64 MB of RAM
 - One 3.5-inch external drive
- 1 Tape drive
- 1 Mouse
- 1 16" color monitor
- 1 14,400 baud modem
- 1 Adapter kit (host) with SCSI bus
- 1 Terminal concentrator
- 1 Ethernet controller kit
- 1 Line printer
- 2 ASSY 39-inch coaxial cables (LG)
- 1 ASSY bulkhead connector
- 1 ASSY Addressable Network Interface Card (ANIC) unit
- 2 CATV surge protectors for data stream
- 1 Uninterruptable Power Supply (UPS)

P.10, line 9 Replace "an integer ranging from 1 to 524,288" with "an integer ranging from 1 through 256,000 or from 262,145 through 518,144."

P.11, line 8 Replace "created and maintained" with "maintained."

P.11, line 26 Replace "260,000 to 262,144" with "260,096 through 262,143."

P.12, line 10 Change "creates, changes, and deletes" to "creates and changes."

Chapter 4

- P.11* Replace the information for *Timer mode* with "Determines how a converter's timeout is reset. When the Timer Mode is set to Y, the converter's timeout is reset only when the converter sees a good reset packet with its own address. When the Timer Mode is set to N, any good reset packet will reset its timeout."
- P.15, line 14* Replace the information for **Standalone Systems** with "Standalone systems change a converter's active/inactive status through the Single Converter Operations screen."
- P.23, line 6* Replace "Change Converter Information function" with "Single Converter Operations screen."

Chapter 5

- P.1, line 25* Change "or a one-way system" to "or a FONE-way system."
- P.3* Delete the paragraph above the **Note:** entry.
- P.3, Note:* Delete "/Channel Schedule."

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1 • Organization of ACC-4000 Documentation

The *ACC-4000 User Manual* is organized into four volumes and provides users with several ways to access subjects.

Content Structure

- Volume I *Overview of the ACC-4000 System:* This introductory volume provides an overview of the system, describing its features and benefits. It also suggests policies for any addressable control system: converter management, pay services, and wire link issues. The major tasks a cable company might perform are described in a step-by-step fashion.
- Volume II *The Graphical Interface:* This provides a step-by-step description of how to perform normal procedures using the Graphical Interface.
- Volume III *The Character-Based Interface:* This provides a step-by-step description of how to perform normal procedures using the Character-Based Interface.
- Volume IV *Reference:* This presents detailed information for occasional tasks. It also provides detailed descriptions of Pay Service Loader (PSL) tasks, wire link configuration, system configuration for the ACC-4000 computer, FONE-way configuration, and PSL configuration. Some general troubleshooting guidelines are provided.

Users and the Documentation

Your organization has several types of users, each of whom may seek different information from the ACC-4000 documentation. The ACC-4000 manuals have been designed to support these differing requirements.

Suggested reading by type of user:

- *Cable company management:* Read Volume I for general overview and recommended policies.
- *System administrator and technical support staff:* Read Volume I for an overview; study Volumes II and III. Become familiar with the contents of Volume IV.
- *CSRs or operators:* Read the individual procedures in Volumes II or III as required.

The volumes are physically separated for the convenience of each type of user. Volume I, for example, might be kept in the manager's office and Volume IV in the system administrator's office, while Volumes II and III might be kept in a place that is accessible to operators.

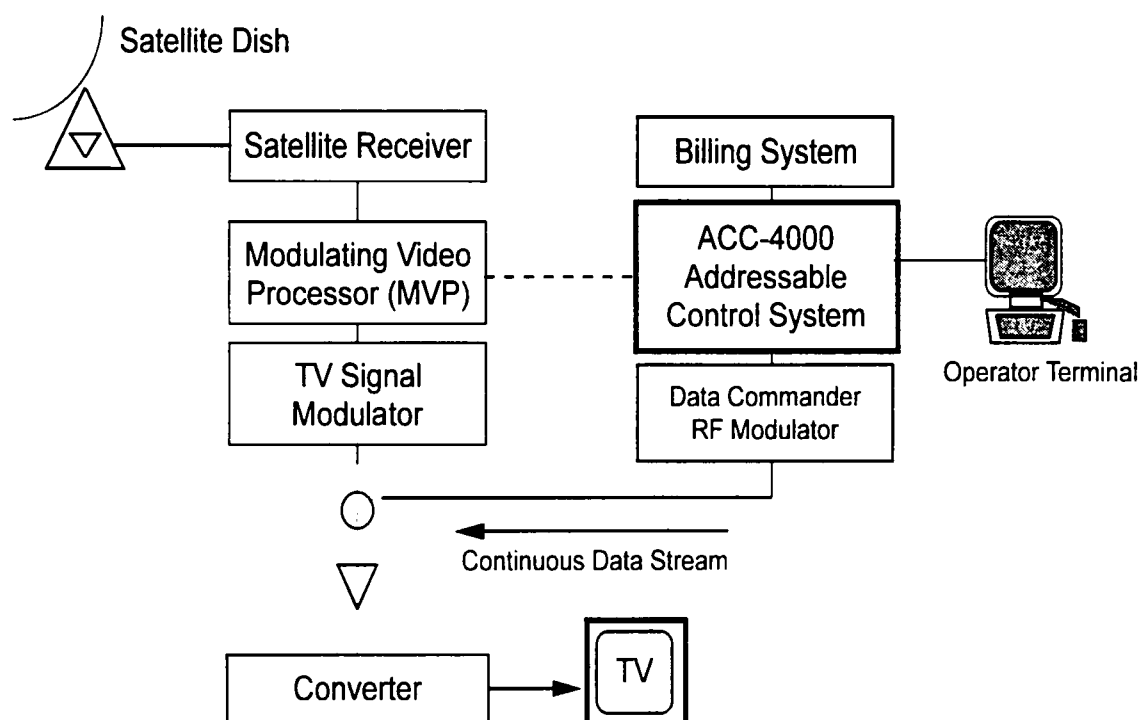
2 • Jerrold Addressable Control Systems

The ACC-4000 is the latest in Jerrold's series of Cable TV and Digital Radio Addressable Control Systems. Predecessors include the AH-1, AH-2, and AH-4 series. Jerrold's TOCOM Micro ACS and ACC-2000 controllers are available for smaller cable systems. The ACC-4000 is intended for larger systems with a full range of addressable services.

The ACC-4000 controls the converters and distributing equipment in a cable system. Its database contains operating data such as subscriber identification numbers, service authorization codes, converter activation and deactivation, time-out resets, event information, and channel maps.

The addressable controller sends commands (punches) and information (such as channel maps) to the converters via the cable system's video transmission lines. The data stream containing commands is repeated continuously; the time interval required for the complete data stream to be propagated a single time is called the *system cycle time*. The cycle time varies proportionally with the number of subscribers on the system, the number and types of services offered by the system, and the volume of data in the data stream. Should the addressable controller go off line, services to converters will not be interrupted; however, until the addressable controller comes back on line, no changes can be made to converter authorizations, and no messaging services will be available.

Typical Cable System



The ACC-4000 may be located at either the system headend or remotely at the system office. Many of its billing functions may be entirely controlled by the cable company's customer billing department via a wire link connection.

The ACC-4000 provides both a Character-Based and a Graphical Interface to give an operator direct access to the full range of ACC-4000 features.

An ACC-4000 operator can add or change data in the system and generate a variety of printed reports. The system administrator sets up passwords for each operator that determine the specific functions to which each operator will have access.

In addition to controlling all the addressable converters in the system, the ACC-4000 also controls other devices, such as scramblers/encoders and RF data transmission/reception devices.

The data stream that the ACC-4000 sends is an FM modulated carrier. Data stored in subscribers' converters for Impulse-Pay-Per-View (IPPV) purchases is collected by the ACC-4000 when a system operator executes a polling operation. The converters respond by transmitting the appropriate data via an RF channel (STARVUE converters) or via the telephone system (STARFONE converters).

The AH-4 series of addressable controllers has proved to be a reliable workhorse which set the addressable control standards in the cable industry for a decade.

With the recent availability of extremely powerful but inexpensive microcomputers, new possibilities have been opened up for addressable controllers. Jerrold's ACC-4000 takes advantage of the speed, capacity, flexibility, and available software of the 80X86 family of microprocessors.

The ACC-4000 is fully backwards compatible: it includes all the functionality available in the Jerrold AH series of addressable controllers and it is compatible with all Jerrold headend equipment and converters.

It offers a number of significant advantages over the AH-4/4E series:

- a smaller physical package (shorter and narrower);
- much more RAM and cache memory, as well as bigger hard disk drives;
- high resolution monitors and X-terminals for improved user interfaces;
- over 10 times the processing speed of the older AH-4 series;
- and expansion potential for adding cards, memory, disk drives, and other parts.

The ACC-4000 uses an Addressable Network Interface Card (ANIC), developed by Jerrold, which eliminates the need for numerous SCX cards. The AH-4 architecture required allocation of memory to the SCX cards, resulting in considerable administrative efforts to ensure the configuration was functional and efficient. The ACC-4000/ANIC requires no such memory partitioning. The ANIC card can handle a very large number of converters without the need for any manual intervention.

The ACC-4000 is the system of the future and will be the platform for new product enhancements by Jerrold.

Comparing the ACC-4000 to the AH-4/4E

Hardware

The hardware components that make up an ACC-4000 system are as follows:

- 1 CPU (computer) with:
 - extensive RAM (up to 64MB)
 - 2 or more large hard drives
 - 1 Tape drive
 - 1 Floppy 3 1/2" drive
- 1 Mouse
- 1 16" Color monitor
- 1 9600 Baud modem
- 1 Adapter kit (host) with SCSI bus
- 1 Network controller
- 1 Ethernet controller kit
- 1 Line printer
- 2 ASSY 39" coaxial cables (LG)
- 1 ASSY bulkhead connector
- 1 ASSY ANIC unit

Computer

The ACC-4000 has been designed around a personal computer. It is capable of supporting multiple character and graphic terminals and printers. It has a modem to communicate with other computers, and comes complete with a kit to establish a wire link to a Customer Billing Computer (CBC).

Cartridge Tape Drive

A high-capacity tape drive is standard with every ACC-4000 system. This high performance, reliable cartridge tape is used to load the original system software as well as any future major software upgrades to the hard disk. It is also used to store and load system and database backups.

Hard Drives

The hard disk drives are used to store the ACC-4000 operating software and data files during normal operation. These have a sealed head/disk assembly, each in a single enclosure, conforming to the industry standard for SCSI disk media.

The modem included with every system allows Jerrold software personnel to perform remote diagnostic procedures. Remedial steps can often be performed without Jerrold field engineers visiting the system site. The modem can also be used to download pay services.

Diagnostic Modem

A dot matrix printer comes with every ACC-4000 system. ✓

Printer

The ACC-4000 system supports VT-200 series, VT-300 series, and VT-400 series terminals, as well as clones equivalent to these terminals.

Terminals

Note: VT-100 terminals and clones are not supported.

An external Ethernet connection is included for high speed connection to devices such as X-terminals.

Ethernet

ACC-4000 Software

UNIX based System

The ACC-4000 software has been developed on the UNIX operating system, which, in conjunction with C language programming, is the standard environment for real-time applications development. UNIX is a full-featured, high-speed, multi-tasking environment allowing efficient performance of all tasks and functions.

Graphical Interface

The ACC-4000 system offers two different interfaces: the *Graphical Interface* and the *Character-Based Interface*.

The Graphical Interface offers users a windows-based, mouse-driven environment which is logically organized and easy to use.

SQL

Standard Query Language (SQL), in conjunction with the relational database used by the ACC-4000 system, has enabled Jerrold to provide a full range of statistics and reports.

Relational Database

The ACC-4000 uses a *relational* database, which provides efficient organization and retrieval of data and allows Jerrold to implement future enhancements in a straightforward manner.

The organization of this relational database is discussed in greater detail beginning on page 2 • 9.

The combination of hardware platform and software design allows the ACC-4000 system to provide all the important capabilities that are essential to an addressable controller in today's cable environment.

ACC-4000 Capabilities

The ACC-4000 can function either in a standalone mode or under the control of a Customer Billing Computer (CBC). The interface with the CBC is via Jerrold's wire link protocol, as implemented in the AH-4.

Standalone Versus In Tandem Operation

The ACC-4000 supports all Jerrold one-way converters and features, including addressability and upgrade (using STARFONE modules) to two-way.

One-Way Converters

The ACC-4000 supports all Jerrold two-way addressable converters and features including STARFONE.

Two-Way (Telephone) Addressable Converters

The ACC-4000 supports all Jerrold RF addressable converters and features.

Two-Way (RF) Addressable Converters

All Jerrold International Converters are supported, including PAL B/G, PAL I, and other options for international cable systems.

International Converters

The ACC-4000 supports Digital Cable Radio (DCR) converters and programming on the same cable network as cable TV converters.

DCR Converters

Impulse Operations

The ACC-4000 provides all IMPULSE features implemented on AH-4 series controllers, and supports all Jerrold IMPULSE-capable converters.

Subscriber Polling

The ACC-4000 provides all polling features implemented on AH-4 series controllers, including filters for operations such as polling converters which have been active.

On-Screen Display (OSD)

The ACC-4000 can send messages to specific converters, groups of converters, or all converters. These messages, usually in text form, are useful for video shopping, customer-specific information, and so forth. (Not all converters are capable of accepting OSD messages.)

Pay Services Loader (PSL)

The ACC-4000 supports the Pay Services Loader (PSL). PSL input containing schedules for services is typically downloaded by modem to the ACC-4000. Dial-in PSL is supported.

Master/Slave

This is a mechanism used to create a hierarchy among converters where there is more than one converter in a home. One converter is designated as a Master; all the others function as Slaves.

The ACC-4000 system uses state of the art database management utilities.

Database Structure

A relational database consists of numerous, relatively simple tables. Tables can be associated by links so that appropriate information is made available as needed. Since these tables are independent structures, it is a straightforward process to add additional fields and manipulate links.

Relational Databases

The result is that the ACC-4000 database has fewer constraints and more flexibility than the AH-4 database.

ACC-4000 tables include:

ACC-4000 Database Tables

- Subscriber table
- Pay services table
- Default converter table
- Channel schedule table
- Scrambler table
- Channel map table
- Purchase table

A short description of each of these follows.

Subscriber Table

This table contains one record for every possible converter that can be connected to the controller. Each record describes one particular converter and contains its serial number, unique subscriber ID, as well as other important information about that converter, such as volume control, impulse converter, number of purchases, and authorization to a particular service.

You can place up to 524,288 records in the subscriber table of an ACC-4000 configured with large hard disks.

Keys: Subscriber ID Number — an integer ranging from 1 to 524,288

Converter Serial Number — 12-character string

Account Number — 12-character text string

Methods of Access: Records in the subscriber table can be added, deleted, and changed through the wire link or by a user at a terminal.

Pay Services Table

This table is used to store information about pay services: three examples are the time service begins, scrambling code, and price.

Key: Pay Service Number — An integer ranging from 1 to 8191

Methods of Access: Records in the pay services table can be added, deleted, and changed only by the user at a terminal.

The wire link can not add, delete, or change information in this table. However, the billing system can download the data file. The wire link then notifies pay services that the loader file is now available, and the Pay Services Loader then makes the necessary changes.

This table contains the information about subscribers which had been inserted into the subscriber record when the add converter operation occurred. The default information allows the system to have a basic template of information for each converter type that it supports.

Default Subscriber Table

Key: Converter Type — an integer ranging from 1 to 35, incremented when new types are defined.

Methods of Access: The data in the table is created and maintained by a user at a terminal. The table is referenced by the wire link or a user at a terminal in the process of adding a subscriber to the database.

This table is used in conjunction with the pay services table for the control of Pay-Per-View events. Information in this table controls the scramblers associated with this service.

Channel Schedule Table

Keys: Date and Time
Channel Number

Methods of Access: The data in the table can be added, modified, and deleted by both a user at a terminal and by the Pay Services Loader.

Each record of the table contains the pay service number key of the pay service in order to tie a unique channel schedule record to a unique pay service record.

This table contains records describing each scrambler connected to the addressable controller.

Scrambler Table

Keys: The table is indexed by three possible keys: the network address of the scrambler (260000 to 262144), the channel number, or the scrambler's logical name. The table is used by the controller to identify the scrambler-to-channel schedule relationship when loading the scramblers with channel schedule information.

Methods of Access: The data in the table is created and maintained by a user at a terminal.

Channel Map Table

This table is used by the system to allow converters a logical-to-physical channel mapping capability.

- Keys:*

The table is indexed by the channel map number value. The records in this table allow the cable operator to specify (for each converter type) that, for example, channel 2 can be viewed on a converter as channel 7.
- Methods of Access:*

The cable operator creates, changes, and deletes channel maps at a terminal.

Purchase Table

This table is used to hold impulse purchase information collected either by two-way RF or STARFONE data collection procedures.

- Keys:*

The table is indexed by date.
- Methods of Access:*

The data is written by the data collection process (RF or STARFONE), read for upload to the billing system by the wire link, and archived automatically.
- Report Generation:*

An operator can display purchase information reports on a screen, send them to a printer, or transfer them to an archive file where they are stored for a pre-configured duration, depending on system procedures.

3 • Site Preparation

A cable company's computer-based control system can provide years of trouble-free service when operated in a controlled environment with adequate support equipment. The purpose of this guide is to help you prepare a site plan that considers some of the conditions that contribute to a favorable operating environment for the ACC-4000. These factors include:

- space requirements
- electrical power
- telephone communications
- temperature and humidity
- safety and security.

The amount and kind of planning you will have to do varies with system size and complexity. For example, a raised floor with its concealed cables may be required by a large system with a variety of services and which uses several hubs with extensive peripheral support equipment; however, a raised floor may not be necessary or cost-effective for a small system which serves only a few thousand subscribers and which offers only limited services.

Note: It is important always to check that the site plan you finally decide upon satisfies both the National Electrical Code (NEC) and local building codes requirements.

General Requirements

Space Requirements

The space requirements for any system are determined by the following factors:

- size of computer system
- size of storage and maintenance areas
- traffic density and work flow
- size, number and location of doors, windows, partitions, columns, ducts, desks, tables, and other on-site items
- possible future additions to equipment and personnel

Floor Plan

The size of the floor plan in square feet is determined by the size of the system and the number of personnel using the system. In designing a floor layout, a grid is recommended. Mark down the position and size all doors, windows, desks, tables, columns, and ducts which are considered potential obstructions to routing cables on the grid. Check the maximum lengths of the cables specified for the equipment. Position the operating equipment to avoid windows, doors, and traffic areas while keeping cable lengths as short as possible.

Locate any cabinets which store material in daily use so that they are readily accessible to operators. Storage cabinets for items such as tapes, floppy disks, printer paper, and ribbons should be fire resistant and in the same environment as the operating hardware.

Note: Materials not stored in this environment should be acclimated to the system operating environment for 24 hours before they are used.

Allocate space for routine maintenance; furnish it with test equipment, work benches, tools, and spare parts. This space should be separate from and independent of space allocated to desks, chairs, filing cabinets, and other furniture. There should also be provisions for prohibiting access by unauthorized personnel.

If the floor is poured concrete and in contact with the earth, it should be insulated, dry, and well cured.

If the system is large or likely to be subject to future expansion, it may be desirable to raise a portion of the floor 6" to 8" above the existing floor. A raised floor:

- makes future changes in equipment and installation less expensive
- provides protection for interconnecting cables and power outlets and avoids the hazards associated with cables on the floor
- allows space between the floors to be used for air ducts, pipes, and other ancillary facilities.

A raised floor should not be less than 5" above the existing floor and should be constructed of steel, aluminum, or fire resistant wood. Where metal is used, it should not be exposed at the surface of the floor, and all metal parts should be electrically interconnected and well-grounded, preferably at several points, and tied to a single grounding post.

Raised Floors

Floor coverings should extend wall-to-wall, inhibit static charges, and should neither collect nor produce dust. Static electricity and dust contaminants for any computer system should always be minimized.

Solid vinyls are the preferred floor coverings because they are durable and hard, resist abrasion, easy to clean, attractive, and produce no static charges. Asphalt tiles or vinyl asbestos are not recommended, because they become brittle and tend to chip and create dust.

Carpets are excellent sound suppressers and insulate against cold floors; however, they may produce static charges. Carpeting is acceptable if treated to reduce or eliminate static, and if the carpeting is lint-free and fire resistant. Conductive rubber mats on the carpet in front of the equipment can dispel electrostatic charges and help protect the computer equipment.

Floor Coverings

The no-wax variety of tile surfaces can be maintained by regular mopping with a dry or slightly damp mop. The mop should be of the lint-free type. On carpets and tile floors, cleaning is possible with a tightly sealed vacuum cleaner if the cleaner bag is changed at frequent intervals. Dry cleaning is always preferable to wet methods because water poses a potential electrical hazard.

Floor Maintenance

Ceilings and Walls

Ceiling and wall surfaces should not flake or trap dust. Sound absorbing surfaces are recommended. Suspended ceilings offer several advantages. Ceiling panels can absorb sound, accommodate recessed lighting fixtures, and are easily removed. Space above the suspended ceiling can contain wiring, air ducts, and pipes, for example, and can offer a convenient method of supporting interconnecting cables when a raised floor is not practical.

Electrical Power

Inadequate attention to power conditioning and distribution can cause equipment failure and resultant service interruptions. Careful planning, therefore, can help avoid many problems. Be sure that all wiring conforms to the National Electrical Code (NEC). This code, published by the National Fire Protection Agency, defines the minimum standards for building electric installations. Use the latest edition and check with local authorities, who often have their own interpretations and amplifications of the NEC.

After meeting the NEC requirements, the following five sources of problems should be addressed:

- lightning storms
- utility company brownouts
- user contaminated power
- inadequate wiring
- power interruptions.

Note: We recommend use of an uninterruptible power supply (UPS) for the addressable controller. This will minimize the effects of shock and brownout, and will provide interim power for orderly shutdown or bridging of service during power outages.

Lightning Storms

Lightning storms can cause sudden power surges, or high energy transients, through the power lines to your computer and the data lines in your network. If these transients reach your computer terminal they may cause crashes or circuit damage resulting in unscheduled downtime. Transient Voltage Surge Suppressors (TVSS) are commercially available and will protect your system from power surges and high energy transients. These should be included in your plan.

Utility Company Brownouts

Brownouts occur during periods of high energy demand when the utility can be forced by circumstances beyond its control, to reduce the voltage available to customers. A brownout can cause major problems in your computer system. The effects of voltage variation may include memory modification, resulting in bad data or system halts during daily backup or other critical computer operations.

Brownouts can produce parity errors and other problems which may be difficult to pinpoint without the appropriate monitoring equipment. Power conditioning equipment which will maintain output voltage to within a few percent with line voltage changes of +/- 15% to 20% is available from commercial sources. Some power conditioning equipment also includes transient voltage suppressers and monitoring features. It is recommended that the site preparation plan include consideration for this type of equipment.

"User contaminated power" occurs when devices such as vacuum cleaners and power tools are used on the premises. Such equipment can produce electrical noise on the power line which may disrupt computer memory and cause garbled characters to appear on a display terminal. "Snow" or noise on a television screen when a vacuum cleaner is running is a common example of locally generated electrical noise. Equipment to reduce or eliminate these noises is commercially available. It is recommended that your site plan include provisions for protecting computer equipment from this type of electrical noise.

Power Conditioning

Inadequate wiring is usually associated with installation sites in older buildings. Grounding requirements for your computer systems require design considerations over and above the National Electrical Code requirements. A power distribution system which satisfies all of the requirements of the code may still not be able to provide the quiet ground needed for optimal computer operation.

Inadequate Wiring

Problems that occur because of inadequate wiring can include system crashes that cause data loss. Electrical grounds to existing conduits or pipes, which may be adequate for most users, may not be satisfactory because the final ground is remotely located at the service entrance. Such grounds may also be intermittently broken by electricians working in other parts of the building. In such cases, as a minimum requirement, a separate and dedicated ground wire should be connected directly from the site to the electrical entrance feeder. The preferred arrangement is to have the utility company install a separate electric service entrance to be used exclusively to feed the site.

If the system is large and the site location is vulnerable to power interruptions, the installation of an emergency power system should be considered. These are commercially available in a variety of designs and load capacities. Some storage battery supported systems with diesel electric charging can supply power automatically within less than one second after power from the utility is interrupted and continue to supply power for extended periods. Other systems using a motor generator will restore power automatically within a few minutes after the commercial power is interrupted. To supply power during short interval interruptions until the motor generator comes on line, uninterruptible (UPS) or standby (SPS) power supplies should be considered.

Power Interruptions

Telephone Communications

Make timely arrangements with the local telephone company to install the telephone facilities for the site. In addition to the telephone lines for voice communication required for normal business operations, dedicated telephone lines for data transmission may also be required.

If the ACC-4000 and the headend are located at different sites, a dedicated telephone line from the computer to the headend may be required. An ACC-4000 telephone-linked system using Jerrold Telephone Network Adapters (TNAs) requires a four wire, C1 conditioned schedule 3002 leased line for full duplex data transmission. The ACC-4000 also requires a phone line to connect to a modem used in a diagnostic capacity. This line should be normal voice grade, dedicated (that is, not shared), and unlisted. This phone line must be separate from the company switchboard (PBX) system and must be without the call waiting feature.

Additional telephone lines are required for Impulse-Pay-Per-View services on a one-way system via STARFONE.

Temperature and Humidity

Computer systems operate reliably and continuously only when temperature and humidity levels are carefully controlled. Excessively high temperatures will generally increase the rate of deterioration of most materials used in computers. High humidity levels can cause condensation of moisture inside the equipment. They can also adversely affect printing operations since paper, after absorbing moisture, changes its size and shape. Excessively low humidity allows the build up of static electricity which, if discharged into the system, may cause intermittent indefinable errors. Recommended temperature and humidity levels are as follows:

Temperature	+18 to +22 degrees C +65 to +75 degrees F	-12 to +40 degrees C +10 to +104 degrees F
Relative Humidity	50 to 60%	20% to 80%

Temperature and humidity within these levels should be stable, avoiding fluctuations larger than 2 degrees Fahrenheit per hour or 2% relative humidity. Store diskettes, tapes, and paper in the operating environment or allow them to adjust to this environment for least 24 hours before use.

The heating and air conditioning equipment required to maintain temperature and humidity levels will be determined by:

Heating and Air Conditioning

- location and climate at the site
- type of building construction (that is, masonry or wood frame, for example)
- number and types of windows and thermal insulation features in construction
- number of people in the work area
- power dissipated by the equipment that will be installed.

It is recommended that, using the above information, a heating and air conditioning specialist specify and then install the appropriate equipment.

Note: It is important to specify that the equipment must provide a 20% margin of safety above the estimated requirements. If further expansion is contemplated, this margin of safety should be increased.

Air Quality

Clean air is essential to the reliable operation of a computer system. If the site is in an industrial area or adjacent to an industrial highway carrying heavy commercial traffic, then additional air filtering beyond that which is normally provided with heating and air conditioning equipment should be considered. Electrostatic precipitators are commercially available and are capable of providing a substantial improvement in air cleanliness. Consult a specialist if air quality is thought to be a problem.

Smoking and the consumption of food and drink in the computer area should be prohibited. Personnel should be discouraged from wearing heavy lint producing clothing such as angora sweaters. The use of aerosol cans in the computer area should be limited.

Safety and Security

Unfortunately, no equipment is perfectly safe or secure. Some level of risk is unavoidable. The following ideas will reduce but not eliminate the level of risk and are therefore presented as suggestions for consideration and not as recommendations. The value of each suggestion will vary according to:

- local conditions
- cost factors
- level of risk which is unacceptable to the owner.

Some safety and security precautions, such as smoke detectors, may be required by local fire, building, and safety codes. Some are for the safety of equipment, while others are designed exclusively for the safety of the personnel.

At a minimum, the site plan should conform to local codes, although there will occasionally be authorized exceptions to this.

4 • Converter Management

The converter inventory represents a sizable capital investment for any cable company. To control and protect this investment, a standardized procedure for converter handling, tracking, and inventory control is essential. Using an efficient inventory control system offers these benefits:

1. Increases accountability regarding converter inventory tracking and converter authorizations
2. Maximizes the efficiency and accuracy of the customer billing process

Employing a converter management system that increases these two capabilities will help ensure that all the inventory information is available, so that informed decisions can be made when addressing system problems which require the commitment of funds or other resources.

An efficient converter management system helps reduce the problems associated with providing subscriber services, and also minimizes the need to physically handle converters, thereby increasing productivity.

This chapter provides information, recommendations, and guidelines for developing effective converter management procedures for your firm.

The following procedures are intended as recommendations. Each cable company should evaluate its individual needs and objectives in order to develop a set of customized procedures.

Standalone versus Wire-Linked Systems

Standalone Systems

In a standalone system the addressable controller (the ACC-4000) does not receive commands from a Customer Billing Computer (CBC).

- There might not be a CBC: subscriber management may be done via the ACC-4000 User Interface.
- There might be a requirement to duplicate data entry on both the CBC and the ACC-4000.

Lack of communication between the addressable controller and the CBC can cause problems:

- Such systems may require duplicate keyboard entries of subscriber information, increasing the chances of human error.
- To avoid authorizing the wrong services for a converter, the two databases must be kept in sync.
- Serial Number and Sub ID entry procedures must be carefully followed, since this is the usual way inventory for service and status changes is identified.

Note: The terms Sub ID and Converter ID are synonymous.

Wire-Linked Systems

In a wire-linked system, the CBC and the addressable controller, both aided by special interfacing software, communicate with each other via a hardwire connection or modem.

- All transactions entered into the CBC are automatically sent to the addressable controller, which then communicates with the addressable converters.
- A minimal amount of data entry is performed directly on the addressable controller, with the exception of certain housekeeping functions such as backups, Pay-Per-View (PPV) and Impulse-Pay-Per-View (IPPV) maintenance, error reconciliation, and certain utilities.

If the CBC or its communication link with the addressable controller should fail, continued converter operation is still possible in the standalone mode. Problems involved with keeping the two databases synchronized must then be addressed.

Note: Unless the operator is familiar with methods to prevent these problems, reverting to standalone operation should be avoided or used only as a last resort.

Remember that transactions entered on the addressable controller keyboard are *not* directly sent to the CBC through the wire link. To keep the databases synchronized it is necessary to run one of the available database verification procedures such as Refresh or Verify on a regular basis.

- **Refresh** – the process that allows the CBC to send database information to the addressable controller
- **Verify** – the process allowing the addressable controller to send its database information to the CBC

Converter Identifiers

Converters can be identified using two different types of numbers. Each of these numbers is unique to an individual converter.

- **Serial Numbers** - These are usually physically marked on the converter, and are used to keep track of the inventory.
- **Converter Identification Numbers** (also known as **PROM Number**) - These are used to keep track of converters in the electronic databases so that the appropriate services can be activated for each converter and billed.

Serial Numbers may have as many as twelve (12) alpha-numeric characters.

Serial Numbers

- The first 10 digits must *always* be used.
- The last two characters in the serial number indicate the model code, and are sometimes referred to as the Tab Number. Each converter model has a unique Tab Number.
- If the CBC supports 12-digit Serial Numbers, it is recommended that all 12 digits be used.

It is preferable to use the Converter’s Serial Numbers to keep track of the physical inventory. Though PROM-type converters can also be tracked using their Sub ID numbers, these converters become untraceable whenever the PROM is removed.

Serial Numbers and Converter Functions

<i>PROM converters:</i> <i>(Types 1, 2, and 3)</i>	Accurate records of Serial Numbers are not required to fully control all of the functions available from these converters.
<i>Downloadable converters :</i>	Serial Numbers are required by both the CBC and the addressable controller.

Converter Identification Numbers

The Converter Identification Number (Converter ID) is a unique number assigned to each addressable converter in the inventory. Before the introduction of downloadable converters, this number was programmed into a Programmable Read Only Memory (PROM) that was plugged into each converter. Although downloadable converters do not have a PROM, the term PROM Number still persists. However, the correct term is actually the Converter ID.

The addressable controller uses a Converter ID to direct specific commands to an individual converter connected to the system. To control an addressable converter, the converter *must* have a unique Converter ID.

As a measure of security all converters should be labeled with a "PROPERTY OF XXX CABLE CO." self-adhesive sticker that includes your address and telephone number. Labels that also act as a history log for the converter are an option to consider.

Converter Labeling

Note: Jerrold supplies red "Security Warning" labels which state that theft of service is a crime. Contact a local Jerrold representative for availability.

For PROM-type converters, it is usually necessary (though not mandatory if accurate Serial Numbers are in the database) to label each converter with the Converter ID (often called the Sub ID) programmed into its PROM. Place this label inside the converter. Placing a label with the Sub ID on the outside of the box invites theft of service and is not recommended, unless coded or disguised.

PROM-type Converters

Downloadable converters require an accurate Serial Number in the database(s), and therefore do not require Converter ID labels. The Serial Number is adequate as the prime identifier for these converters; a label identifying the cable company should still be affixed to the converter.

Downloadable Converters

The following guidelines should be considered when applying any label to a converter.

Labels and Safety Precautions

- Be careful not to block holes, because doing so may adversely affect the thermal performance and, therefore, the reliability of the converter.
- Apply labels only to the bottom or back of the converter.
- If a converter is supplied with a hand held remote control device, a "PROPERTY OF---" on the back of this device may also be desirable. Some systems include a channel map on this label.

Inventory Guidelines

Entering Converters into Inventory

A converter may be considered *in inventory* the moment it is unloaded from the delivery truck. However, it is not part of the system's controlled inventory until its Serial Number has been entered into the database. All converters, including those in the warehouse, issued to technicians, installed on a subscriber's property, returned to the vendor for repair, lost, stolen, or misplaced should be entered into the database. Converters should be entered into inventory within 48 hours of receipt (preferably within 24 hours). Allowing converters to sit in a warehouse without being entered into inventory invites losses.

Converters may be placed in inventory using the CBC's functional equivalent of the ACC-4000 Add New Converter function. A converter in inventory is considered to be:

- **Connected**, if a unique Converter ID has been assigned and entered into the ACC-4000.
- **Disconnected**, if only its Serial Number has been entered into the CBC.

Precautionary Guidelines

Adding inventory is a warehouse function and should be the responsibility of a single person with a backup for when that person is absent. Other personnel should not generally have access to inventory functions. Disasters have occurred when systems allowed CSRs to add inventory on-the-fly. Typically, problems occur when a CSR tries to check a converter into a customer account but can't find the converter in inventory. To correct this, the CSR then adds the converter to inventory, creating the disaster. Most likely, the CSR had the incorrect Serial Number and Converter ID in the first place. Now there are two problems:

1. The converter will not work because the wrong information was entered.
2. A bogus converter has been entered into the inventory database(s).

If a converter cannot be located in inventory, every effort must be made to determine that the correct Serial Number, Converter ID, or both, has been entered. Then if the converter record still cannot be found, the converter should be returned to the warehouse so that it can be entered into inventory correctly after discovering the original reason for its absence. When a discrepancy is suspected, the CSR should always ask the customer to read the Serial Number out loud and be prepared for the format of the expected response (that is, number of digits, tab number, and so on).

Barcodes

Converter Serial Numbers can be entered into the system manually or by using a barcode reader. It is preferable that the required converter information be entered using a barcode. Jerrold offers the Model AH-BAR-VT Barcode Reader for use with CRTs connected to the ACC-4000.

Jerrold downloadable converters are shipped in cartons (generally 10 units per carton) that have Serial Number Barcodes affixed to an exterior side; cartons are arranged on their shipping pallets so that all barcodes face outward. This makes inventory entry with a barcode reader easy and fast since the cartons do not have to be removed from the shipping pallets.

Additional barcode labels are provided with converter shipments as follows:

- 1) In a plastic bag attached to the side of each carton
- 2) Affixed to the bottom of each converter chassis
- 3) On a peel-away sheet on the bottom of each converter chassis.

Note: For maximum security, shipments of new converters should be entered into inventory within 48 hours after they are received (the sooner the better). A shipment of 1000 converters requires about a full day to enter into inventory manually. Using a barcode reader, the same process can be accomplished in less than two hours. The results are also more accurate, since there can be no typographical errors.

Segregated Converter ID Assignments

Converter IDs for downloadable converters are assigned by the ACC-4000. The ACC-4000 assigns the lowest available disconnected ID. Although the ACC-4000's Converter ID selection can be overridden, there usually is no reason to do so.

It was once advantageous to segregate different converter models into separate ranges of Converter IDs. This is no longer necessary, especially in wire-linked systems, because the ACC-4000 is able to track different converter models by their Type Number.

IPPV Converters

IPPV converters are the exception and do require Converter ID segregation. Converters are loaded into areas of the ACC-4000 database called Subscriber Partitions. Each Subscriber Partition consists of 32K ($32 \times 1024 = 32,768$) Converter IDs and each is assigned to hold only one of the following broad categories of converters:

- One-Way
- Two-Way RF (STARVUE IPPV)
- Two-Way Telephone (STARFONE IPPV).

IPPV converters, in order to operate properly, *must* be assigned in their appropriate partition: either two-way (RF) or Phone.

Providing that the correct converter Model Code or Type Number is specified when adding inventory, the ACC-4000 will automatically assign a Converter ID in the proper Subscriber Partition.

Certain basic information must be programmed into each addressable converter before it can respond to commands from the addressable controller. This information is either burned into a PROM (installed in the converter) or downloaded into a converter during the initialization process.

The information generally programmed into a PROM includes:

- *Site Code* - Used to identify the cable system owning the converter.
- *Converter ID* - A unique number that identifies the logical address of a converter.
- *Timeout* - Establishes the length of time a converter will continue to operate without control signals from the addressable controller. The allowable maximum interval is usually determined by converter model and type.
- *Timer mode* - Determines how the converter will operate in certain important situations, such as when the:
 - converter is first plugged in
 - converter is installed in a cable system with a different site code
 - the timeout count expires.

A Converter Mode *on* setting will allow basic service during any of the above conditions.

Converters with *no* batteries (DRX, DRZ, DRZP, DRZD, DRZID, ABD-A) must be programmed with Converter Mode *on* to prevent complete loss of service after a momentary power interruption.

Converters with batteries (DRZIN) should be programmed with Converter Mode *off*, since the battery maintains the converter's authorizations during a power interruption.

PROM-Type versus Downloadable Converters

PROM-Type Converters

Converter Modes

PROMs and Repairs

After a PROM has been programmed and installed into a converter, it should always remain in that converter. Switching PROMs also switches the Converter ID. This causes the addressable database to become inaccurate.

If a converter is sent to repair, a functioning PROM should always remain in the converter. Whenever a PROM is defective, it should always be replaced with an exact duplicate. Repair centers should make every effort to ensure that PROMs are returned in the same converter in which they were received.

Note: To make this task easier, both the converter and the PROM should be labeled with the same ID.

Operating parameters are downloaded into downloadable converters only when they are initialized. This achieves the same result as PROM programming. Downloaded parameters are identical to those burned into the PROM, except that:

- Downloadable converters have non-volatile memories so that the Converter Mode is normally set to *off* (see Default Connect Status, line 96 of CONFIG.DAT).
- IPPV converters are usually not set for the maximum timeout. Instead, they are set to a value which minimizes non-responding converter results.

Systems with accurate Serial and Type Number databases can initialize any downloadable converter connected to the system via the ACC-4000 keyboard. Wire-linked systems can do the same through the CBC. This allows the operator to avoid the labor of initializing converters in the warehouse.

In addition to the parameters already listed for PROM-type converters, the following parameters for downloadable-type converters are downloaded during initialization:

- *Channel Map* - Indicates the RF channel tuned for each displayed channel. This allows unique packages of channels to be created to meet changing market requirements.
- *Barker Channels* - Related to the channel map. These parameters tell the converter which RF channel to tune when certain conditions exist or events occur. These are:
 - *Disconnect Barker* - Determines which RF channel is tuned whenever a converter deactivates, either by specific command (Activate or Initialized field set to N), a site code mismatch, or because its timeout has expired.
 - *Deauthorized Barker* - Determines which channel is tuned when a subscriber selects a pay service the converter is not authorized to receive.
 - *Parental Control Barker* - Determines which channel is tuned whenever a channel under parental control is selected.
 - *Event Barker* - Determines which channel is tuned when a PPV event free preview period expires and the event is still available for purchase.

Downloadable-Type Converters

Parameters Downloaded During Initialization

- *On Barker* - Available only on Impulse 7000 series converters (T9D datecode or later), this parameter determines which channel is tuned whenever the converter is turned on.
- *Credit Barker* - Available only on Impulse 7000 IPPV converters (T9D datecode or later), this parameter determines which channel is tuned when the converter's credit limit is reached.
- *Telephone Index* - Pertinent only to STARFONE converters, this parameter determines which telephone number the converter calls to report IPPV purchases.

**TC-A Terminal
Configurator**

Do not use the TC-A Terminal Configurator in ACC-4000 systems because it increases the potential for database mismatches.

To protect the security of the system and discourage theft of services, converters should be active only when they are installed in a subscriber's residence and producing revenue. Converters in the warehouse or otherwise not installed to a subscriber's residence should be kept inactive.

Active versus Inactive Converters

- **Active** or **"hot"** converters – All basic channels are allowed.
- **Inactive** or **"cold"** converters – Do not allow basic channels to be viewed. Depending upon the Model Number and how it has been programmed, a cold converter will show either:
 - all snow
 - a predetermined channel (disconnect barker)
 - full basic services in the case of a STARBASE without a "D" in its model code.

Standalone systems use the "Change Converter Information" function, available in the ACC-4000, to make a converter either active or inactive.

Standalone Systems

Wire-linked systems generally make a converter inactive by checking it out of a subscriber's account, returning it to a cold inventory location, or both. A converter is made active by checking it into a subscriber's account after it is installed. Although this may result in some delays since it requires real-time communication between the installer and the office, it is strongly recommended for minimizing return truck rolls and for response verification of Impulse PPV converters.

Wire-Linked Systems

Some sites have experimented with installing hot converters and then downgrading them to the ordered services after a number of days as an effective pay service marketing tool.

Alternative Procedures

Converters may also be made active and moved into a hot inventory or technician's location. However, this is usually undesirable since it invites theft of services. With some CBCs a converter placed in a hot location can be set to deactivate if it is not placed on an account or reissued within some period of days (usually 7 to 10). Check with your CBC vendor to determine what options are available.

Inventory Locations

The CBC in a wire-linked system can be used to define various inventory locations. Each location usually corresponds to the physical location where the converter is found. When a converter is moved from one location to another, inventory locations can be changed to provide an audit trail of the converter's movement. Some parameters may also be defined for converters in each location:

- Whether the converter is active (hot) or inactive (cold)
- Pay services and subscriber features
- The maximum time the converter is expected to remain in that location.

Precautions

In general, the fewer the number of locations that can adequately track the movements of converters, the better. Some companies find that two or three locations are adequate. Others have used locations that can track a converter as it is moved from a stack on the floor to a stack on a table to a technician's truck. Both of these cases are extreme. An excessive number of inventory locations adds little to accountability, and creates excess work and paper.

The only active location should be the subscriber's premises. The active converters should be those contributing to the system's revenue base. Converters in the warehouse, returned to the vendor for repair, lost, stolen, or not recovered are drones because they are not contributing to the system revenue base and represent no return on assets. Drones should be kept to a minimum.

Although each site should develop an inventory tracking system which best fits its operations, the following inventory tracking method is provided as an illustration:

Inventory Tracking System

Location	Active?	Remove Mask in 7-10 Days	Remarks
1 New Stock	N	N	Used to put new converters on inventory in CBC (not in ACC-4000); no converter ID's assigned.
2 Test New	Y	Y	Converter ID assigned by ACC-4000 and reported back to CBC.
3 Issued to Tech	Y	Y	When connected to cable at subscriber's home, has all services for testing and marketing purposes (until mask expires).
4 In a Home	Y	N	Provides whatever services customer has ordered.
5 Removed from Home	N	N	Deactivated.
6 Test Used	Y	Y	Testing for both PROM-based and downloadable converters.
7 Tested Bad	N	N	Converter defective, but not sent for repair yet.
8 At Repair	N	N	
9 Return from Repair	Y	Y	Puts test mask on, and initializes (downloadable home converters).
10 Scrap	N	N	For accounting purposes.
11 Stolen	N	N	For accounting purposes.

Issuing, Activating, and Tracking Converters

There are two methods for tracking converters:

- Paper tracking
- Electronic inventory location tracking.

Both are acceptable, and the method you choose depends on the conditions and facilities available in your cable system.

Recommended Procedure

An ideal tracking system should include all of the following steps or procedures:

1. The warehouse person who prepares or stages converters prior to issue moves all Serial Numbers for the converters to be issued to an employee to a unique inventory location. This inventory location is assigned to the employee taking possession of the converters.
2. The CBC automatically generates a sign-out sheet.
3. The employee initials the sign-out sheet as he or she takes possession of the converters. This provides both accurate inventory location tracing and employee accountability for each converter.
4. As soon as a converter is issued, ideally it should be checked into a subscriber's account that same day.
5. If hot converters are issued, the technicians usually will turn in paperwork at the end of each day. They must indicate which converters were installed in each subscriber's home.
6. The office then takes all of the sheets for the day and someone on the office staff performs the check-in work in a batch format. This is usually performed during the next business day, unless specifically dictated otherwise by the marketing plan.
7. If cold converters are issued, the technician calls the office from the subscriber's home and a CSR, dispatcher, or voice response unit checks the converter into the subscriber's account and sets the services in the converter.

While calling the office from every job site may be aggravating, in the overall scheme this generally requires less paperwork by the staff and provides a convenient means of tracking the progress and problems of the technicians. Many factors must be considered when trying to determine the best converter issue procedures for any given site.

Note: This idealized tracking system, though not common at present, is likely to become more common, especially in systems which issue large numbers of converters.

For systems not able to implement the entire procedure just described, some type of sign-out sheet is still very desirable to maintain the necessary accountability.

Systems that issue hot converters must use *both* paper and electronic tracking systems:

Hot Converters

- *Electronic tracking system:* Used to change converters' hot and cold status.
- *Paper tracking system:* Used to maintain the required accountability (unless an automatic move to cold is available).

Tracking systems for standalone systems must address similar issues.

Standalone System

- If only cold converters are issued, sign-out sheets are sufficient to maintain the needed accountability.
- If hot converters are issued, the standalone system requires that issued converters be activated using the ACC-4000 Change Converter Information function.

Note: Contact Jerrold for assistance if you are having difficulty with your procedures.

Steps in Tracking Cold Versus Hot Converters

The following steps must be performed to move a converter from a delivery truck to the top of a television set:

Cold Issue	Hot Issue
1. Enter Inventory	1. Enter Inventory
2. Issue Converter	2. Unpack Converter
3. Check-in/Set Services	3. Initialize Converter
4. Initialize Converter	4. Repack Converter
5. Move to Hot Location	
6. Issue Converter	
7. Check-in/Set Services	

Disadvantages of Hot Converters

In addition to the extra workload, particularly in the warehouse, there are several other disadvantages to the issuing of hot converters:

1. The extra handling of the converters increases the risk of damage.
2. There is no opportunity to verify that the correct services have been matched to the customer’s billing record.
3. Converter diagnostics must be run after each installation to verify that the addressable control carrier is reaching the converter. (The DRX and DRZ converter families do not have diagnostics displays.)
4. Extra converters issued must be made hot before they leave the warehouse and returned to cold inventory if they are not installed.

Comment

This last step may become unnecessary with wire-linked systems using Wire Link Configuration Software Version 3.45 or higher with some Customer Billing Systems. In these systems, the ACC-4000 wire link will automatically issue an initialize command when the converters are placed in a certain status (for example, the “To Status” being CABLETEK’s Home Status of “In” for a newly installed converter).

Converters which have been entered into inventory should remain in inventory for the life of the converter. A Converter ID assigned to a converter should be "married" to that Serial Number for the life of the converter.

Deleting Converters From Inventory

Converters should only be deleted from inventory for one of the following reasons:

1. The converter has been sold or transferred to another cable system or converter broker.
2. The converter has been damaged beyond economically feasible repair and has been destroyed and disposed of.
3. The converter has been altered from a one-way to a STARFONE or STARVUE or vice versa.
4. As a temporary measure when reconciling errors.

In each case, the converter should be deleted from inventory so that its Converter ID can be reissued to another converter. When adding or removing a STARFONE or STARVUE module, the converter should be immediately added back into inventory with its new type number. This is the only situation in which it is acceptable to "divorce" a converter Serial Number from its Converter ID.

Converters are deleted from inventory through the CBC's equivalent of the ACC-4000's Delete Converter function when the CBC and the ACC-4000 wire link are configured to allow deletes on-the-fly. Otherwise, converter deletions might need to be performed on one or both of the systems depending on the purpose for the deletion. After a converter has been deleted from inventory, it becomes impossible for the system to trace that converter. However, if the converter deletion is performed on an ACC-4000 function in a standalone capacity, a message is printed to the console log buffer.

Primary Method

Another way of deleting a converter from the CBC is to change its status to non-addressable and then delete it from the ACC-4000.

Alternative Method

Note: Just like adding converters to inventory, the authorization to delete converters from inventory should be assigned to a single person. Two other precautions are usually also considered necessary: performing deletes on-the-fly through the wire link should not be allowed; password access to deletes on the ACC-4000 should be limited.

Lost or Stolen Converters

Lost or stolen converters should remain in the database inventory. However, all services and features *must* be disabled.

To help track down the missing converter or to establish responsibility or liability for the equipment, these converters should also remain associated with the last subscriber account or technician known to have had custody of the converter.

After about a year, the probability that the lost or stolen converter is still connected to the cable system is almost zero. If converter ID space is becoming low, these long-lost or stolen converters may now be deleted from inventory and replaced with new converters.

Note: Reissuing the Converter ID that belongs to a lost or stolen converter violates the fundamental principle that each converter has a unique ID number. This could allow theft of service, since the lost converter will be authorized for the same services as the new converter with the same converter ID.

Pay services and subscriber features such as remote, volume, or parental control are all controlled independent of whether the converter is active or deactive.

- *Wire-linked* systems activate these services by installing them on the subscriber's account.
- *Standalone* systems use the ACC-4000 Change Converter Information function to activate converter features and to authorize pay services.

Pay services are usually controlled and billed separately, although both the CBC and the ACC-4000 are capable of packaging or bundling services so that authorizing one service will automatically authorize two or more services that are sold together as a package.

Pay Service and Subscriber Features

In wire-linked systems, the CBC, when deactivating a converter, will normally set all pay services and subscriber features to *off*. Standalone systems must set all pay services and features individually.

Deactivating Converters

When returning a converter with authorized pay services and features to cold warehouse inventory, it might therefore appear easier to simply set the Active field to No and leave the rest alone. This is **not** recommended because:

- When some converters (SB-As) are set to Inactive with pay services left *on*, the converter will continue to function and descramble the pay services.
- When all pay services and subscriber features are not set to *off* when a converter is made inactive, much of the value of the ACC-4000's extensive reporting capability is lost.

The CBC will normally set all pay services and subscriber features to *off* when deactivating a converter.

Wire-Linked Systems

Standalone systems must set all pay services and features individually. When returning a converter with authorized pay services and features to cold warehouse inventory, it might therefore appear easier to simply set the Active field to No without doing anything else.

Standalone Systems

This is not recommended and should be avoided because:

- A. When some converters (SB-As) are set inactive but with pay services left *on*, the converter will continue to descramble pay services.
- B. When all pay services and subscriber features are not set *off* when a converter is made inactive, much of the value of the ACC-4000's extensive reporting capability is lost.

5 • Pay Service Management

The term *pay services* refers to channels or programs which may be optionally selected by a cable television subscriber, usually at additional cost. To view a pay service, the subscriber's converter must be authorized to view that service, and only those converters which are authorized are able to view the program.

Pay Service Concepts

Terminology

There are three different categories of pay services:

- Subscriptions

A premium channel, such as *HBO* or *Showtime*, which has an infinite duration and is always active. This is generally offered on a monthly basis.
- Events

A program with a limited duration, such as a sporting event or first-run movie. Unlike a subscription, an event is active only during a predefined period.
- Packages

This can be a combination of events or subscriptions, or both. A package allows these combinations to be authorized as a single item.

Two other terms are also frequently associated with pay services.

- Pay-Per-View

(*PPV*) Offers include individual special events and recently offered segments of subscription services for separate purchase.
- Impulse-Pay-Per-View

(*IPPV*) Allows impulse purchase of events. Requires a two-way (RF) system with a STARVUE converter or a one-way system with a STARFONE converter.

**Pay Service
Attributes**

Attributes used to describe pay services and how they should be handled include:

Service number	Every pay service has a unique number associated with it, which is known as the service (or tier) number. This number is used to represent the service in the ACC-4000 and billing system databases.
Service code (Tag)	This is the actual code which will be broadcast with a scrambled subscription or event. A converter must be authorized to descramble the given service code in order for the subscriber to watch that service or event.
Active state	A pay service is active during the period when a service code is reserved exclusively for that service. An active service may be allocated to any subscriber. However, a subscriber's record can be authorized for a pay service only after the service has been defined on the ACC-4000 system and is active. The service code associated with an active service is removed from the Global Service Code Off list and then added back to it when the service number window expires.
Purchasability	A service is purchasable only when its <i>purchase window</i> is open. A purchase window is the time span, set by the cable system operator, during which subscribers can "impulse" purchase the event.

Channel Schedule Attributes

Pay services may be scheduled to be broadcast as many times as desired during any 24-hour period. This *Pay Service Scan Interval* (set in the System Configuration file) can be controlled by the ACC-4000 for any channel equipped with a *Jerrold Modulating Video Processor* (MVP), or *Digital Scrambler/Encoder* (DS/E) with the remote option. The MVP responds to ACC-4000 commands to determine its scrambling state, and has an internal queue which may be loaded with future scrambling states. This allows the MVP to operate for a period of time independent of the ACC-4000, should the ACC-4000 or the data path to the scrambler fail.

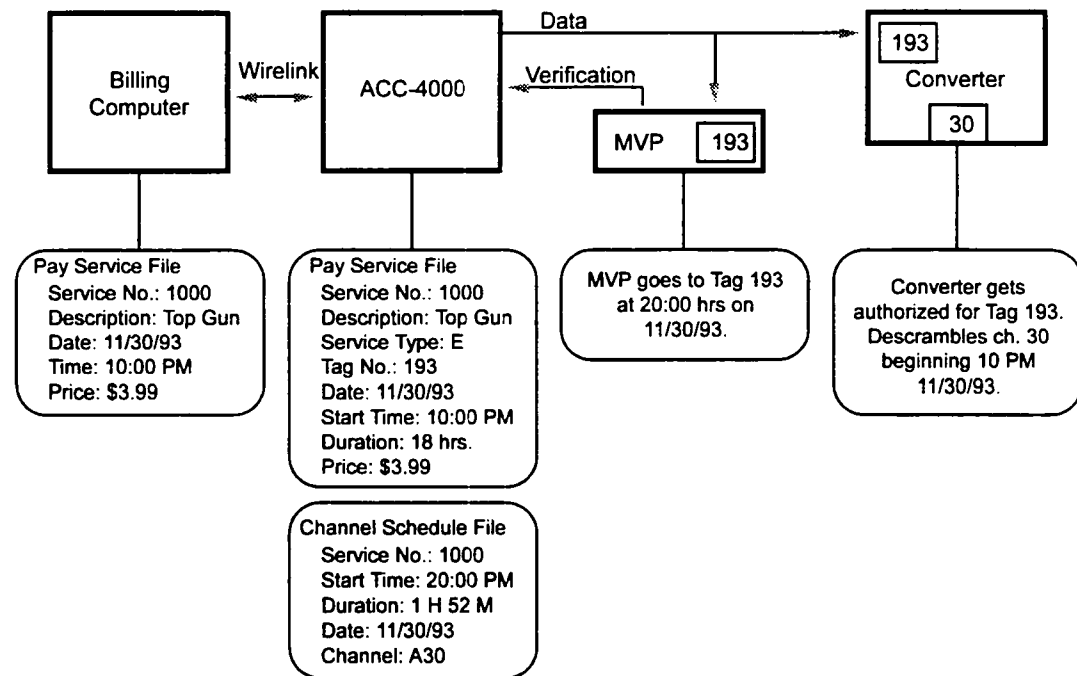
Pay services may be scheduled on any channel defined in the ACC-4000's MVP definition file. The services to be scheduled are listed in the Channel Schedule file, which contains all the information necessary to set up the MVP to broadcast the event. Scheduled services are converted into queue elements as follows:

- If a preview is specified (IPPV only), a queue element is required for the service to be broadcast in the clear.
- After the preview period (if any), a queue element is required for the main body of the event.
- If the service is purchasable (IPPV only), and there is a purchase time limit set, then a queue element is required to change the purchase state to *off* at the specified time. It should be remembered that when offering PPV services with either ARU or ANI ordering systems, the Customer Billing Computer (CBC) may set other ordering limits.
- If there is no program scheduled to start immediately after the current program, a null queue entry is required to define the MVP state between programs. The default values for the channel, as specified in the MVP definition file, are used.

After the channel schedule has been defined on the ACC-4000 system it must then be entered onto the CBC. The procedure for entering a channel schedule on the CBC varies with each billing system.

Note: Contact your billing system vendor for details on Pay Service/Channel Schedule entry on their computer.

*Typical PPV System
Authorization*



In the example illustrated above, the pay service is identified by service number, its name on the billing system, service code (or tag) and the corresponding name on the ACC-4000 system. Customer orders are processed for active services or events and then subscriber converters are authorized by the ACC-4000 to descramble the programs which have been ordered.

Management Considerations

Before attempting to set up pay services on the ACC-4000, it is important that you first formulate an overall pay service plan. Although this is an informal step, which does not involve any direct interaction with the ACC-4000, it will allow you to:

- Establish the nature, range, and frequency of the services to be offered. This is essentially a marketing decision as to what services are to be offered, when, and to whom.
- Determine the steps that will be performed periodically to set up and maintain your pay service system.
- Consider how the addressable system and the distribution system are configured and the type of CBC to be used.

Obviously, before deciding on which type of maintenance routines will be set up, it is first necessary to decide what type of pay services your cable company intends to offer. The ACC-4000 controller system can provide all three types of pay services (*services, events, packages*) simultaneously.

Choosing the Services to Be Offered

Of course, there are limitations regarding the number of events that can be offered during any 24-hour period, and to which subscribers they can be offered. The number of services, as well as how and when they are offered, depends on the system's configuration and the cable company's willingness to change the existing system's configuration.

Before offering PPV or IPPV events, the cable company's management should consider the following:

- A. How often will PPV events be offered?
 1. occasionally
 2. once per week
 3. several times per day
- B. How far in advance of events will orders be accepted?
 1. a day
 2. a week
 3. more than a week
- C. How close to event time will the system stop accepting orders?
 1. 60 minutes
 2. 30 minutes
 3. 10 minutes
 4. some number of minutes into the event

- D. How will event orders be processed?
 - 1. Customer Service Representative (CSR)
 - 2. Automatic Number Identification (ANI)
 - 3. Audio Response Unit (ARU)
- E. How many pay services will be defined in the ACC-4000 pay services database at any one time?
- F. How often will event service codes be reused?
- G. Will PPV and IPPV services be offered simultaneously?

Answers to these questions will help define the types of pay services the cable company wishes to offer, and may be used as the foundation for a pay services business plan.

When preparing your company's pay service plan, the following practices should be considered:

Recommended Practices

- Assign the responsibility for coordinating all pay services to a *single* person.
- Have at least one CSR available *at all times* to answer subscribers' inquiries. This includes after business hours, holidays and weekends.
- Have a technician available *on 24-hour call* to service any headend problems that may arise.
- *On a regular basis*, check that the CBC and ACC-4000 databases are synchronized.

System Configuration

The system configuration has a direct impact on the Pay Services which can be delivered. For example, to offer IPPV services, it is necessary to use STARFONE or STARVUE converters. Other less obvious system features will also impact on the quantity and quality of the services that can be offered and therefore should be considered.

The three main configuration issues are *partitions*, *pay service definitions*, and *system cycle time*.

Converter Partitions

The converter records must be partitioned according to generic converter type (that is, one-way, STARFONE, and STARVUE). Up to three types of dedicated partitions may be required, depending on the converters in the cable system:

1. one or more for one-way converters
2. one or more for STARFONE converters
3. one or more for STARVUE converters.

System Cycle Time

The system cycle time affects the time interval that the service code (tag) should be activated in advance of the event. Generally it is good practice to allow at least 2 to 3 times the system cycle time prior to the actual event start.

Pay Service Definitions

Pay service definitions must be entered into the Addressable Controller before the system will accept an order for an event.

Note: Any orders for events sent through the wire link before the pay services are defined will be lost.

Both the CBC and the ACC-4000 are capable of bundling several services into a package.

Pay Service and Subscriber Features

Remote control and volume control are the only subscriber features that are sold separately. Other features such as parental control, time controlled programming, and last/favorite channel recall are usually packaged with the remote control service. An operator may, however, choose to package these services differently. On some models, both parental control and volume mute feature (and F-mute for unity-gain setting) are available from the set-top keypad. All other available features are accessed only through the hand-held remote unit.

Bundling of Features

An operator may choose to package these services differently. On some models:

- Parental control is available from the set-top keypad as is volume mute (and F-MUTE for unity-gain setting).
- The remaining features are only available through the hand-held remote unit.

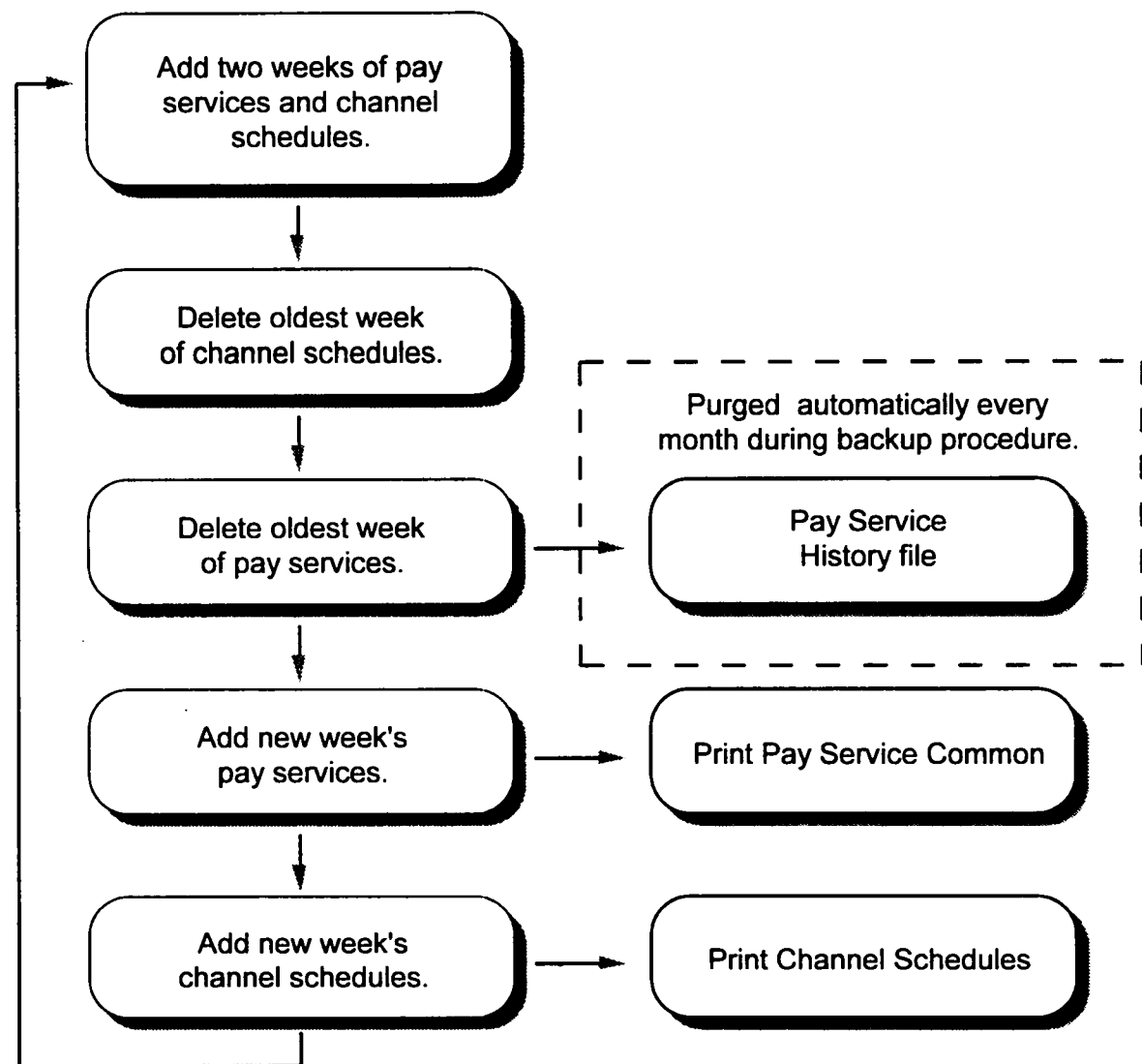
Management Tips

The pay services and channel schedule files should be updated on a regular basis. The frequency for backups depends on:

- size of the system
- number of services offered
- system configuration (one-way or two-way).

The figure below illustrates the steps used to update the pay services and channel schedule files on a weekly basis.

*Pay Service Management
Flow Chart*

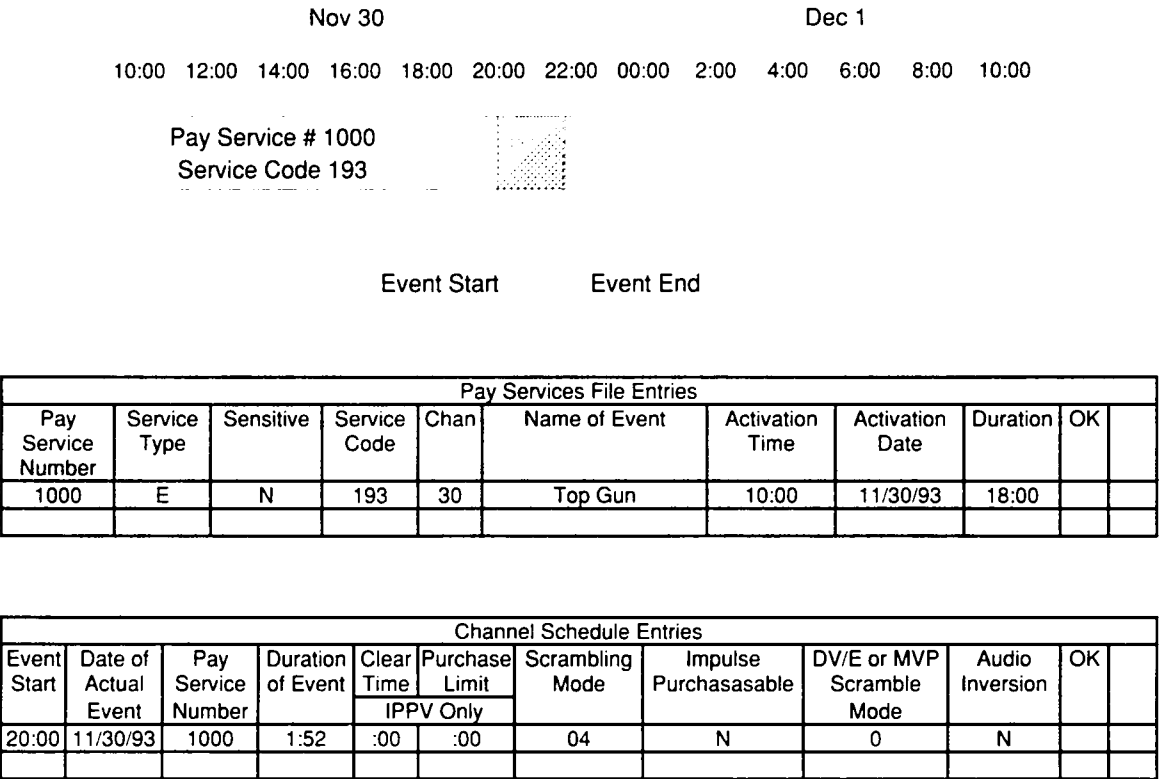


Note: A description of each of the procedures referred to in the above diagram is found in the appropriate section of Volume II or III. Example, *Add a Channel Schedule* is found in the *Service/Schedule* chapter.

Before these services can be provided, the pay services and the channel schedules for the services must first be defined and then loaded into the ACC-4000. Figure 1 illustrates a typical PPV pay service definition with the pay services file entries and channel schedule file entries that are to be loaded in the controller. Typical worksheets for preparing the entries are included at the end of this section.

Pay and Pay-Per-View (PPV) Services

Typical PPV Pay Service Definition



You will learn more about these entries in Volumes II and III. We invite your attention to the following:

Service Type: This entry is either E (event) or S (subscription). If S is entered, the duration entry is omitted and the service continues until it is deleted.

Sensitivity: Set to either Y (yes) or N (no). The Y entry is valid only in systems using STARCOM 450 converters which require a Y if the parental control feature is active. If STARCOM 450 converters were but are no longer on the system, then line 66 of the configuration file should be set to zero (0).

Clear Time and Purchase Limit: These terms only apply to IPPV services and need no further definition here.

Chanel Schedule Worksheet

Service # _____ to _____

Date _____ to _____

Channel # _____/Service _____

[illegible]

